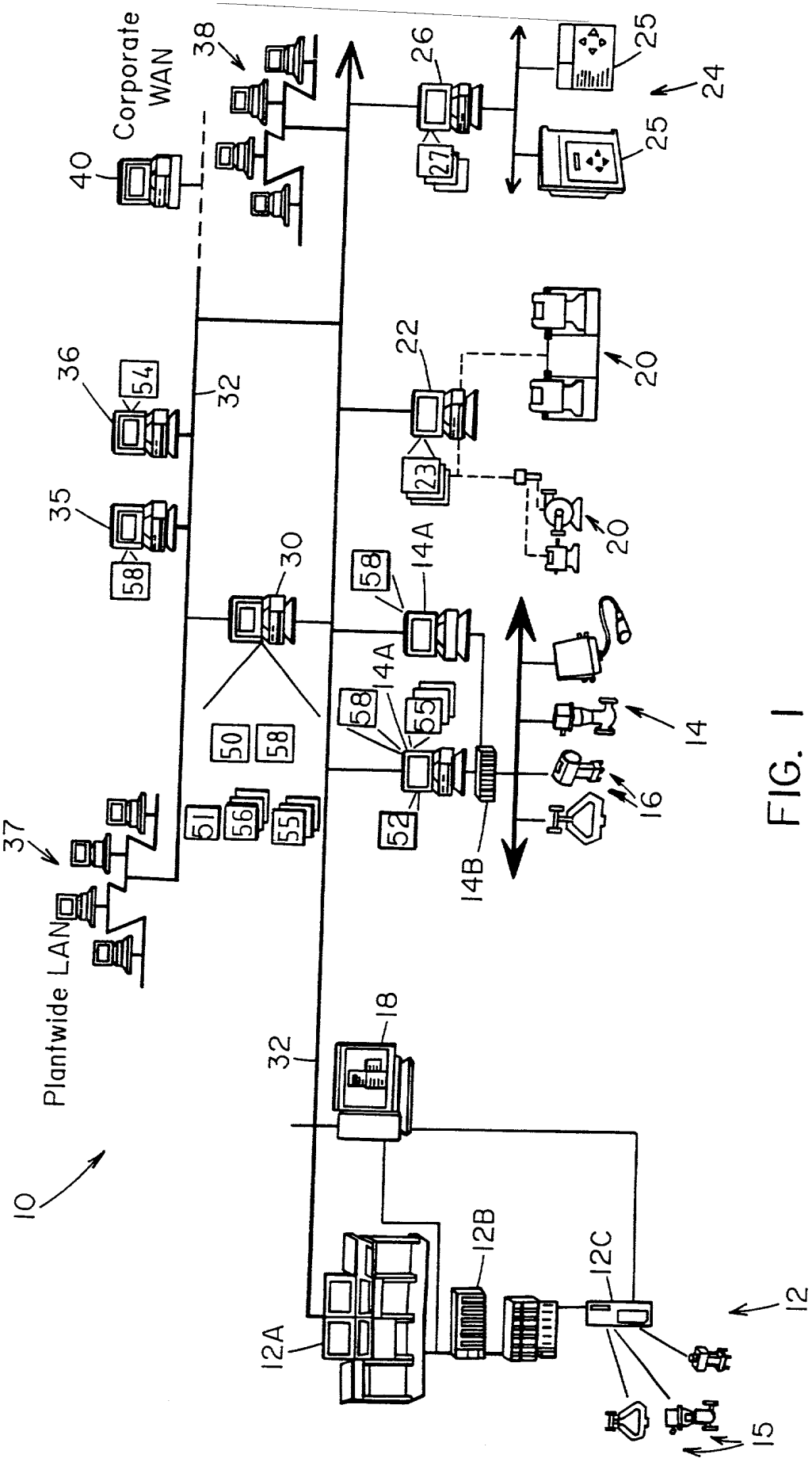

Corporate WAN
Plantwide LAN
10
12
12A
12B
12C
14
14A
14B
15
16
18
20
22
23
24
25
26
27
30
32
35
36
37
38
40
50
51
52
54
55
56
58

FIG. 1

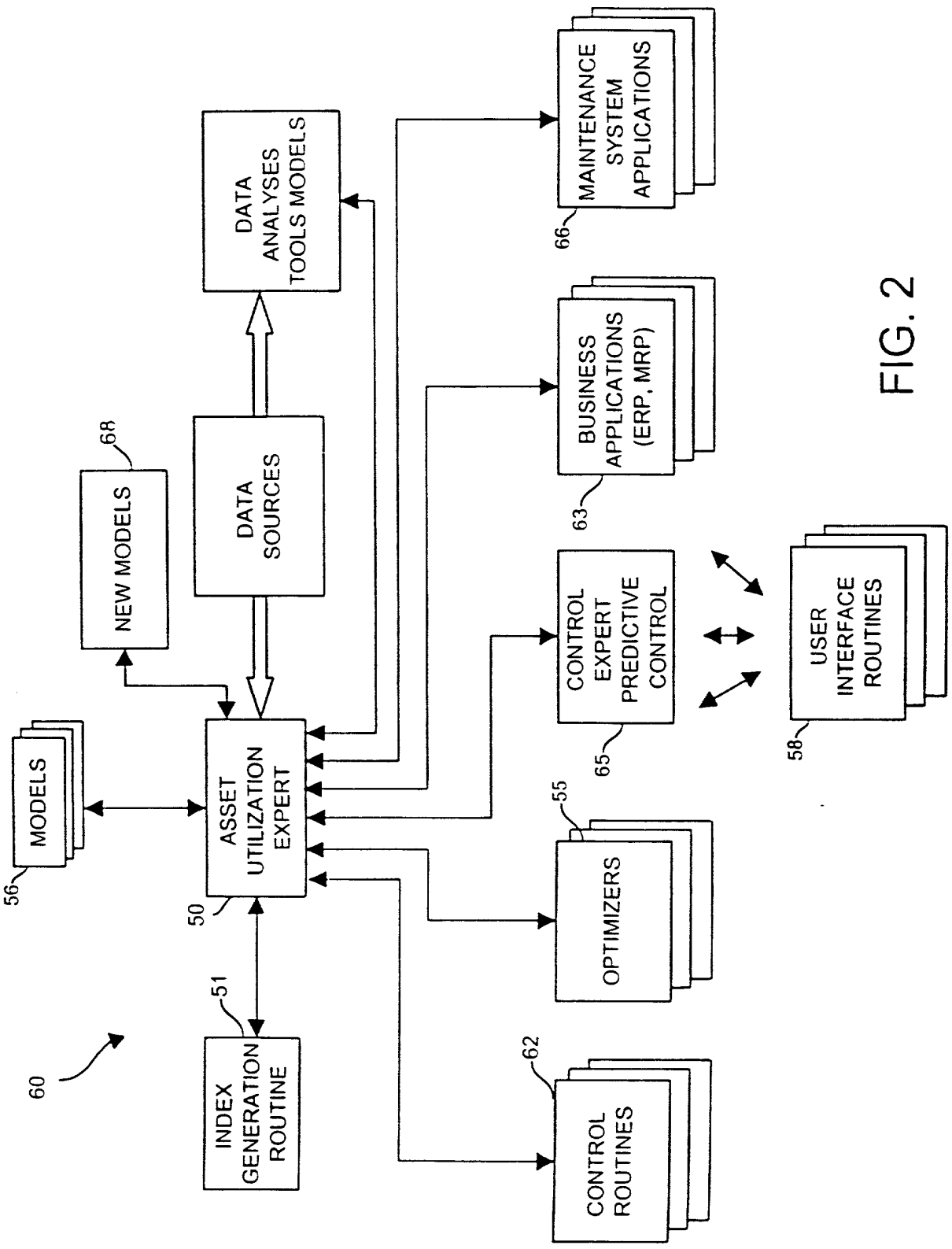

60
INDEX GENERATION ROUTINE
51
MODELS
56
ASSET UTILIZATION EXPERT
50
NEW MODELS
68
DATA SOURCES
DATA ANALYSES TOOLS MODELS
MAINTENANCE SYSTEM APPLICATIONS
66
BUSINESS APPLICATIONS (ERP, MRP)
63
CONTROL EXPERT PREDICTIVE CONTROL
65
OPTIMIZERS
55
CONTROL ROUTINES
62
USER INTERFACE ROUTINES
58

FIG. 2

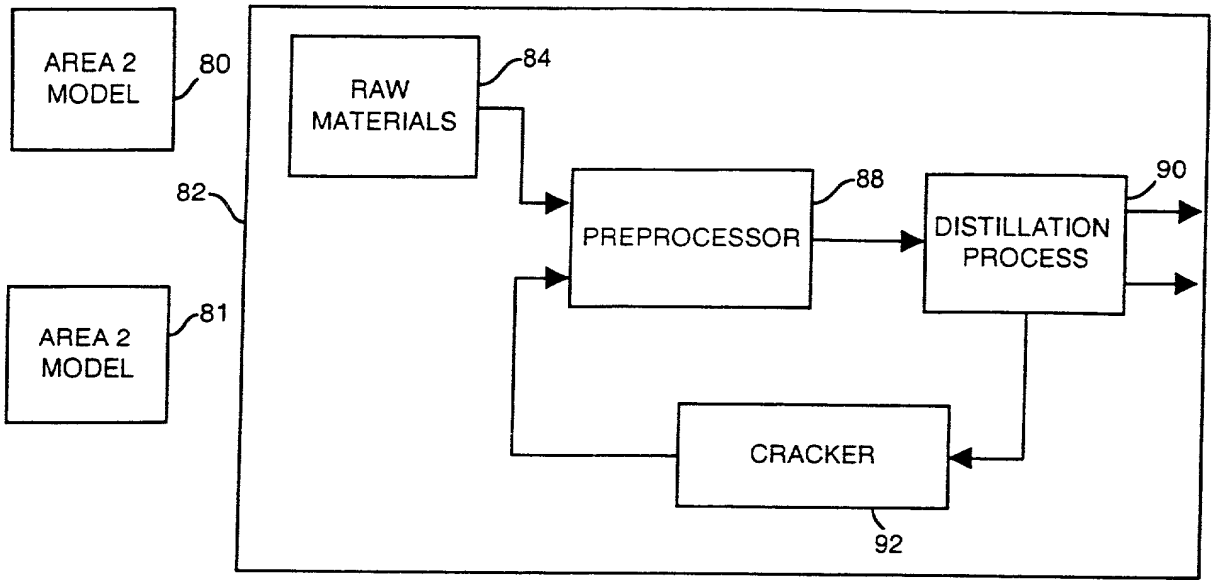

AREA 2 MODEL
80
RAW MATERIALS
84
82
PREPROCESSOR
88
DISTILLATION PROCESS
90
AREA 2 MODEL
81
CRACKER
92

FIG. 3

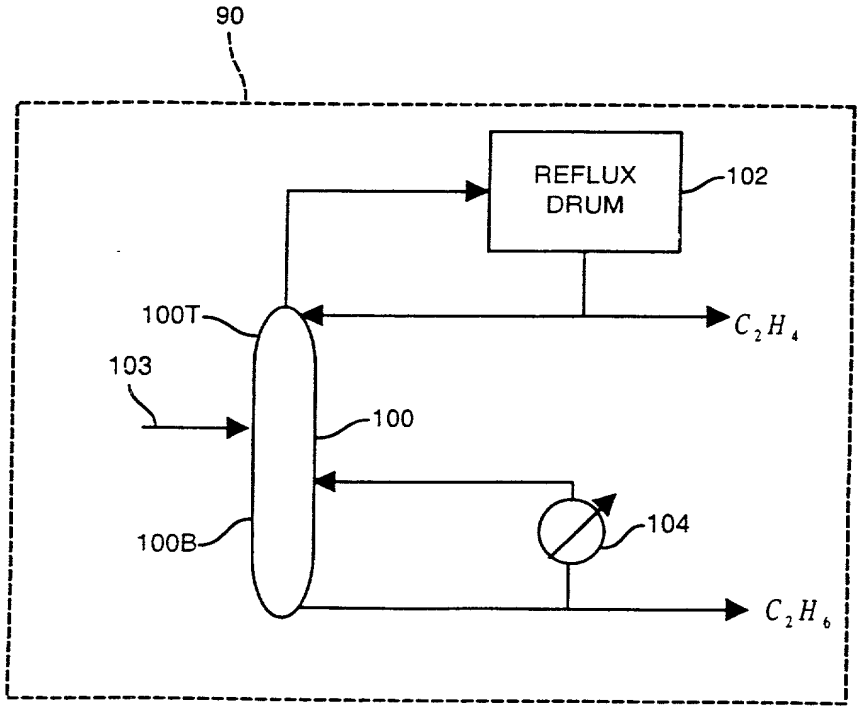

90
REFLUX DRUM
102
100T
C_2H_4
103
100
104
100B
C_2H_6

FIG. 4

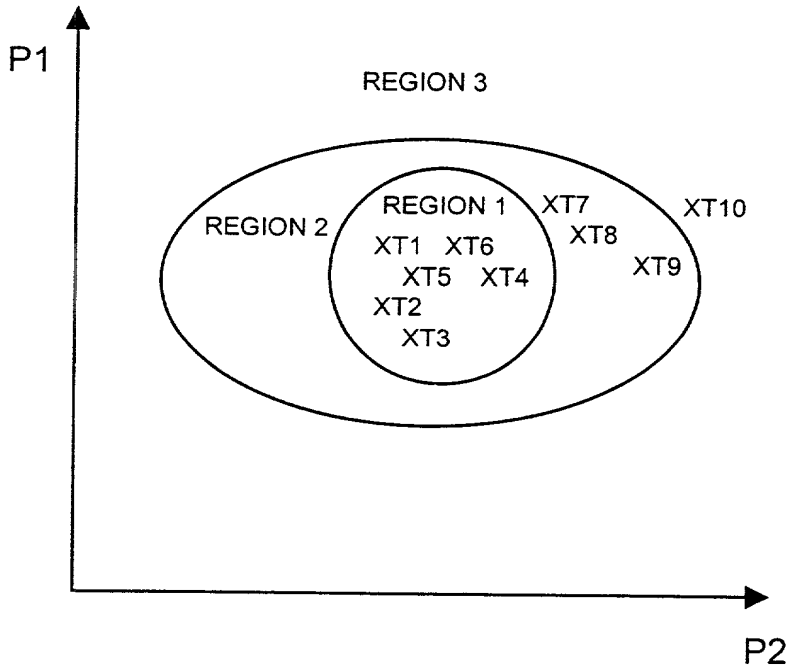


FIG. 5

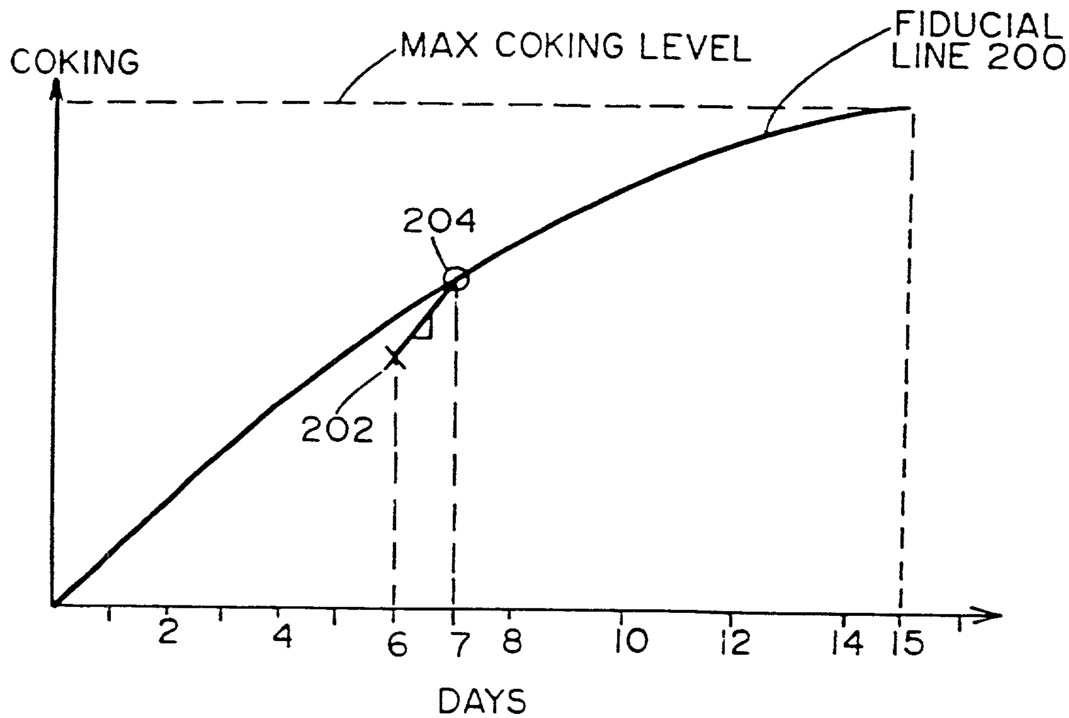

COKING
MAX COKING LEVEL
FIDUCIAL LINE 200
204
202
2
4
6
7
8
10
12
14
15
DAYS

FIG. 6

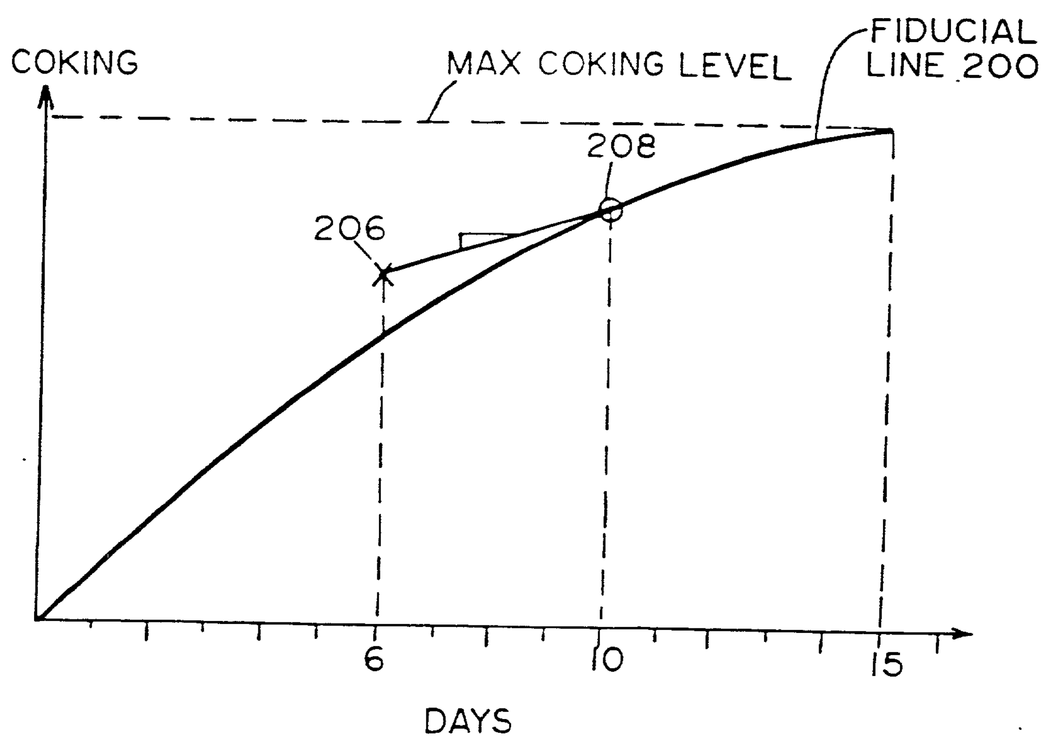

COKING
MAX COKING LEVEL
FIDUCIAL LINE 200
208
206
6
10
15
DAYS

FIG. 7

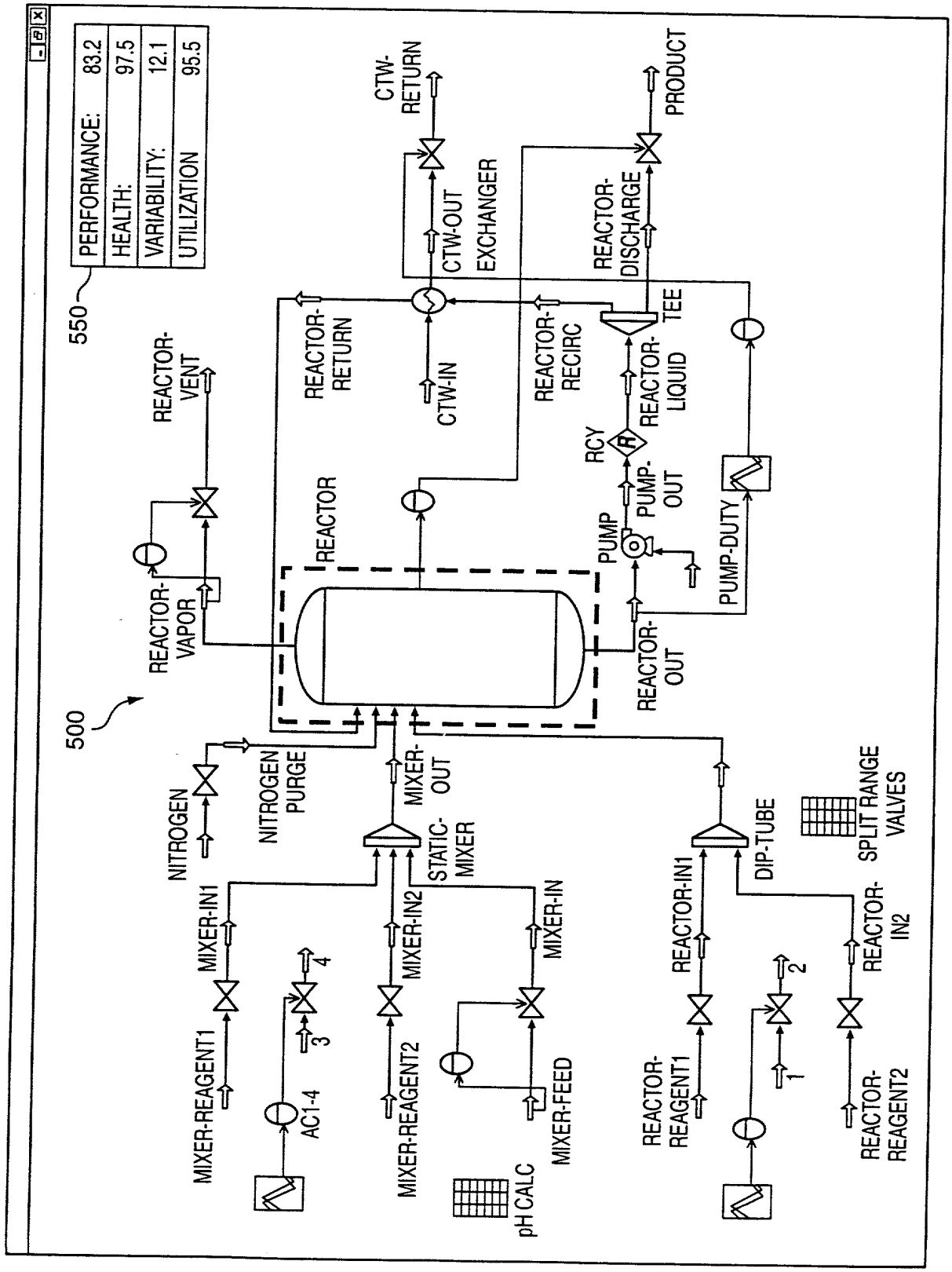

PERFORMANCE: 83.2
HEALTH: 97.5
VARIABILITY: 12.1
UTILIZATION 95.5
550
500
REACTOR-VENT
REACTOR-VAPOR
REACTOR-RETURN
REACTOR
CTW-RETURN
CTW-OUT
EXCHANGER
CTW-IN
REACTOR-RECIRC
REACTOR-DISCHARGE
PRODUCT
REACTOR-LIQUID
TEE
RCY
PUMP
PUMP-OUT
PUMP-DUTY
REACTOR-OUT
NITROGEN
NITROGEN PURGE
MIXER-OUT
STATIC-MIXER
MIXER-IN1
MIXER-IN2
MIXER-IN
MIXER-REAGENT1
MIXER-REAGENT2
MIXER-FEED
AC1-4
pH CALC
REACTOR-IN1
DIP-TUBE
SPLIT RANGE VALVES
REACTOR-IN2
REACTOR-REAGENT1
REACTOR-REAGENT2

FIG. 8

	PI	VI	HI	UI
Unit	x		x	x
Sub Unit	x		x	x
Loop		x	x	x
Device		x	x	

FIG. 9

PERFORMANCE FOR FCCU: 83.2

575

Loop Name	Index	Weight
FIC-101	88	3
TIC-111	89	3
LIC-111	88	3
FIC-111	60	3
FIC-112	80	1
TCI-222	87	1
FIC-101	88	3
TIC-111	89	3
LIC-111	88	3
FIC-111	60	3
FIC-112	80	1
TIC-222	87	1
PIC-111	87	1

FIG. 10

FCCU Health: 97.5

Device Name	Index	Description	Weight
FV-111	100	Leaking	3
TI-111	98	Sticktion	3
LI-111	90	40	3
MC-101	95	Will burn up in 2 weeks	3
FV-111	96	0	1

FIG. 11

FCCU Variability: 12.1

Device Name	Index	Weight
FV-101	0	3
TI-111	2	3
LI-111	40	3
FV-111	0	3
FV-112	0	1
TI-222	2	1
FI-101	7	3
TI-111	6	3
LI-111	7	3
FI-111	7	3
FI-112	7	1
TI-222	7	1
Sub unit: Reboiler RB101	15	2

FIG. 12

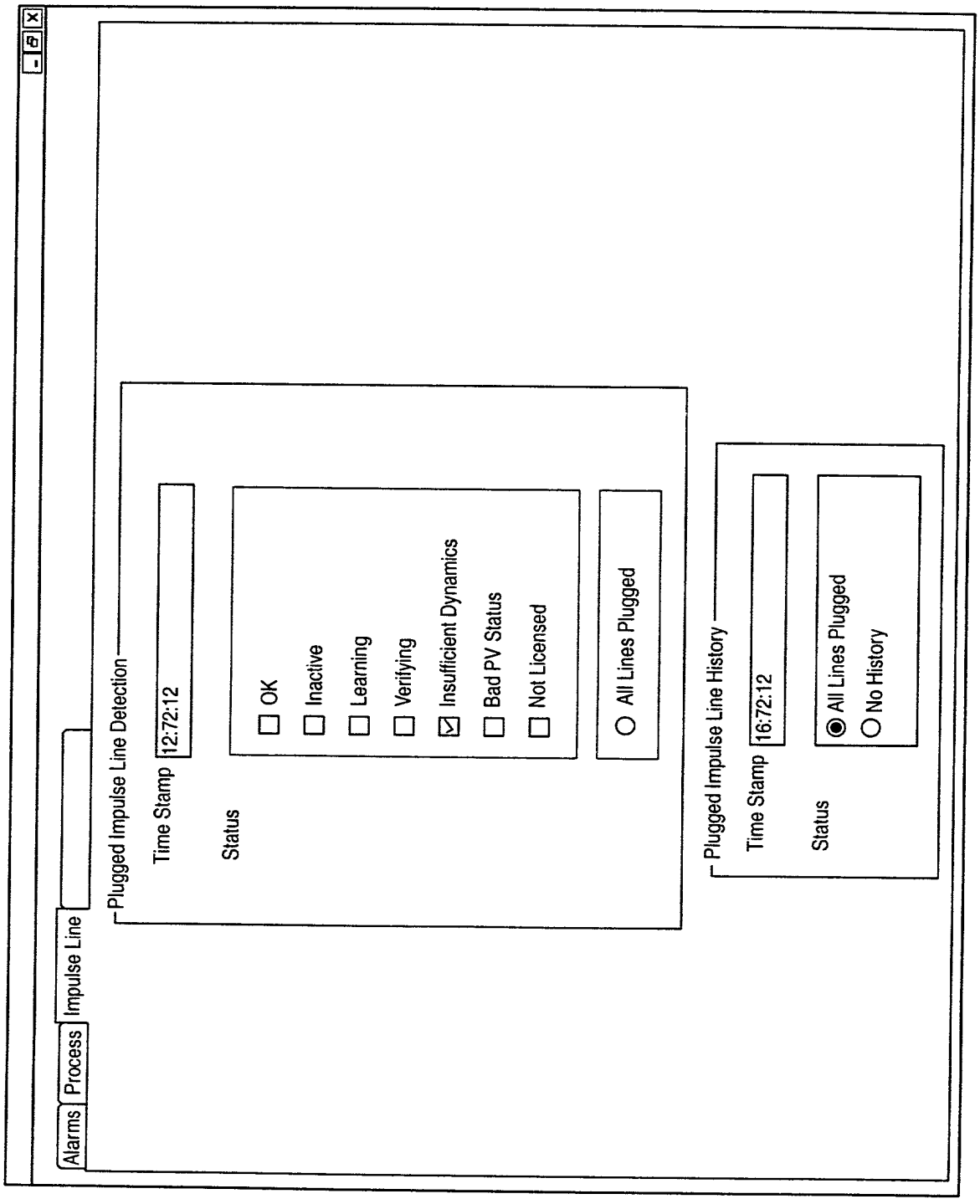

Alarms
Process
Impulse Line
Plugged Impulse Line Detection
Time Stamp
12:72:12
Status
OK
Inactive
Learning
Verifying
Insufficient Dynamics
Bad PV Status
Not Licensed
All Lines Plugged
Plugged Impulse Line History
Time Stamp
16:72:12
Status
All Lines Plugged
No History

FIG. 13

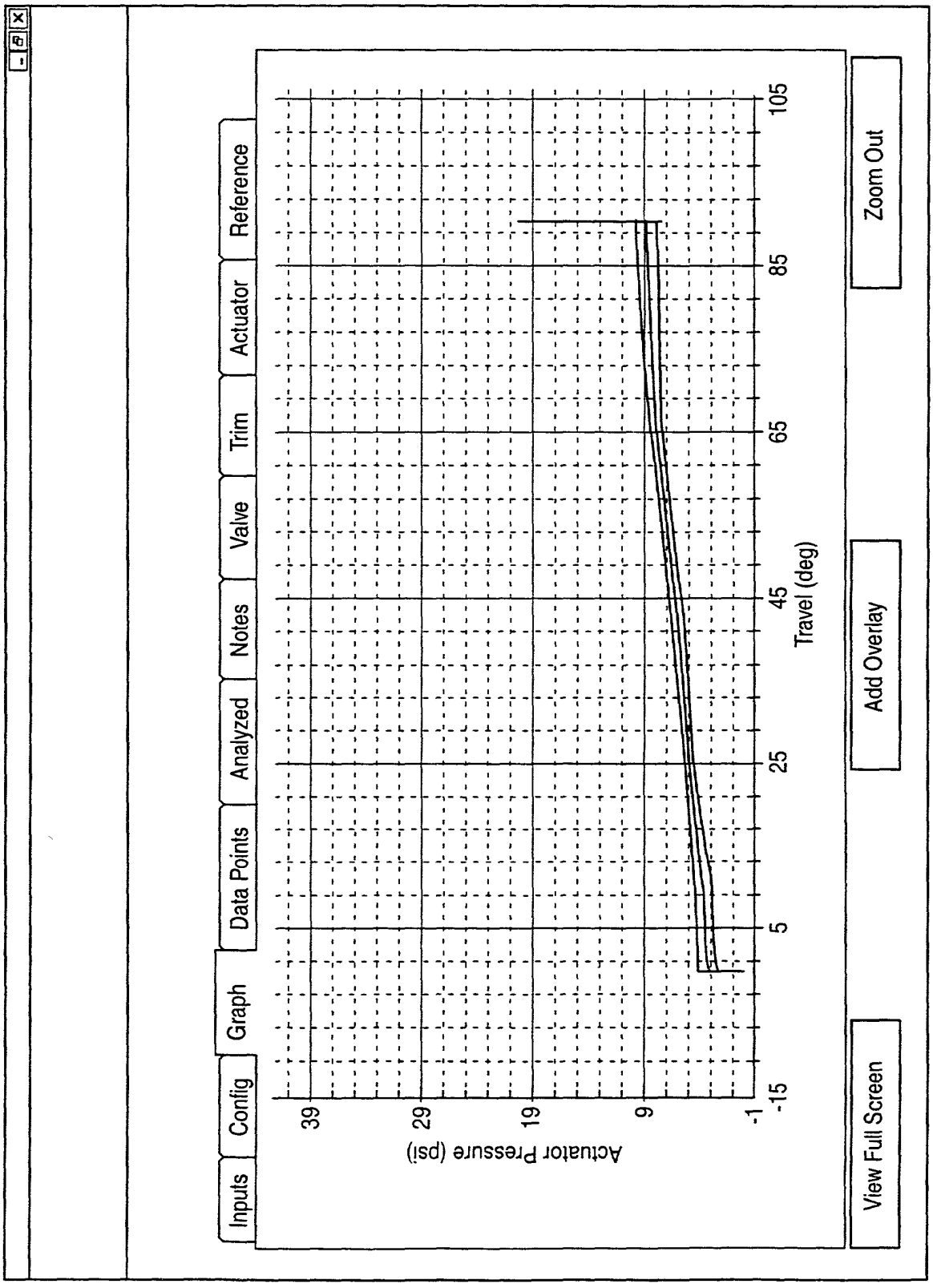

Inputs
Config
Graph
Data Points
Analyzed
Notes
Valve
Trim
Actuator
Reference
Actuator Pressure (psi)
39
29
19
9
-1
-15
5
25
45
65
85
105
Travel (deg)
View Full Screen
Add Overlay
Zoom Out

FIG. 14

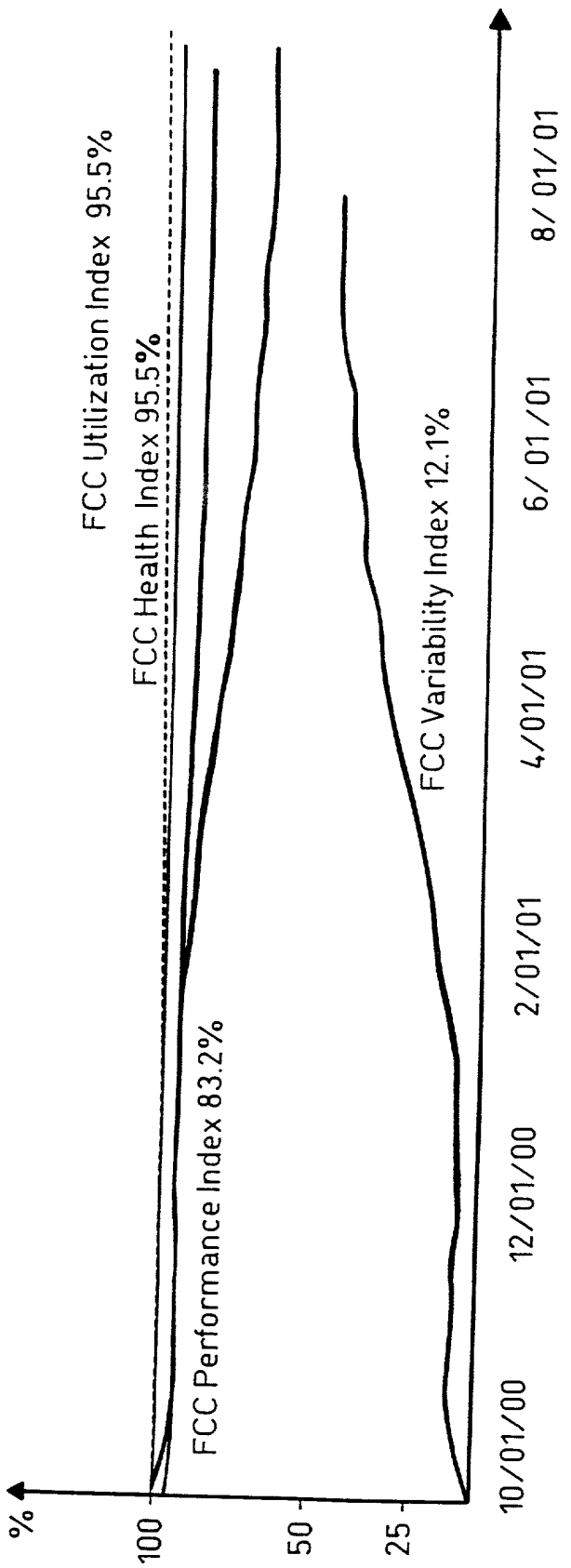


FIG. 15

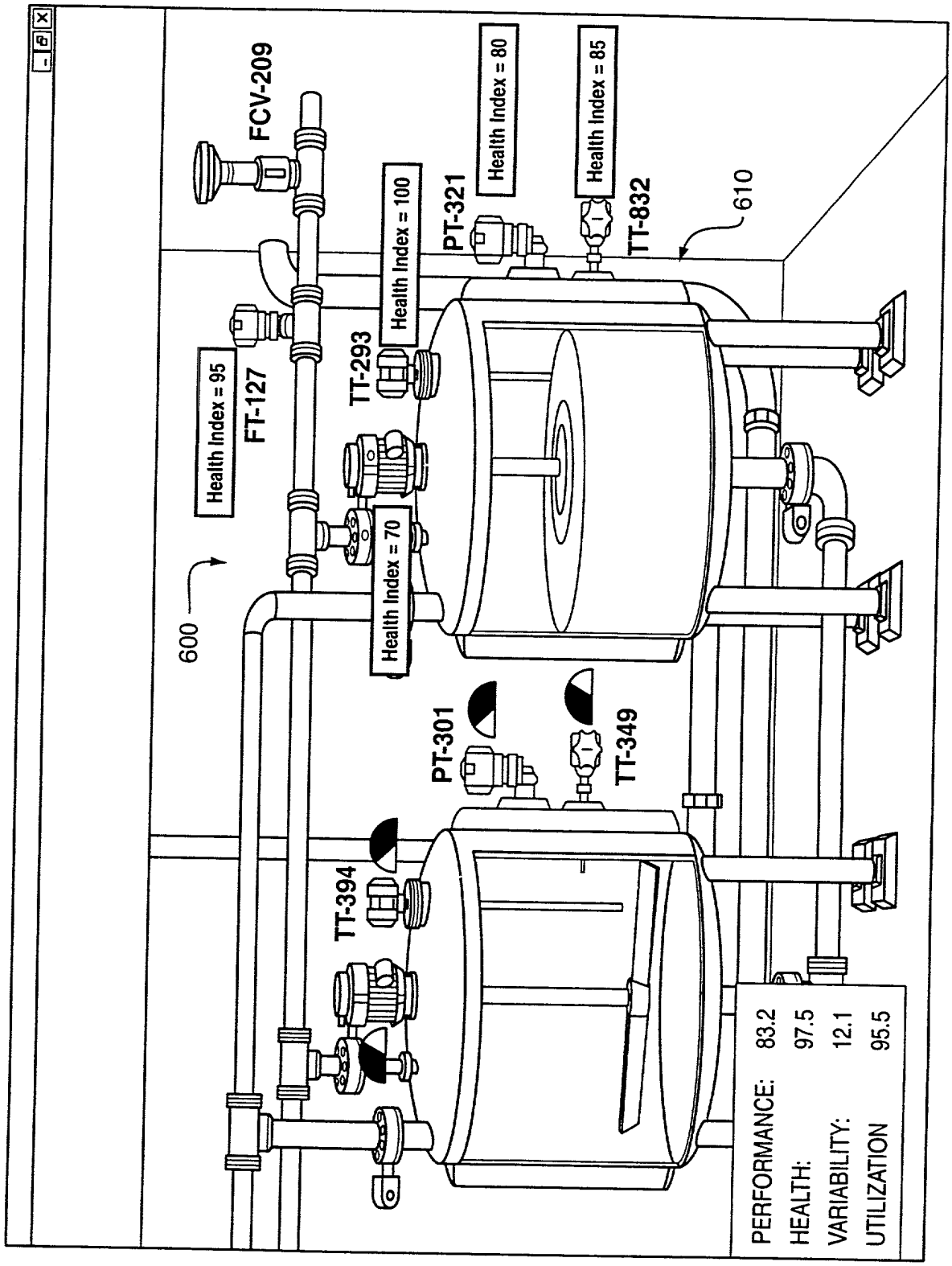

FCV-209
Health Index = 80
Health Index = 85
PT-321
TT-832
610
Health Index = 100
TT-293
Health Index = 95
FT-127
600
Health Index = 70
PT-301
TT-349
TT-394
PERFORMANCE: 83.2
HEALTH: 97.5
VARIABILITY: 12.1
UTILIZATION 95.5

FIG. 16

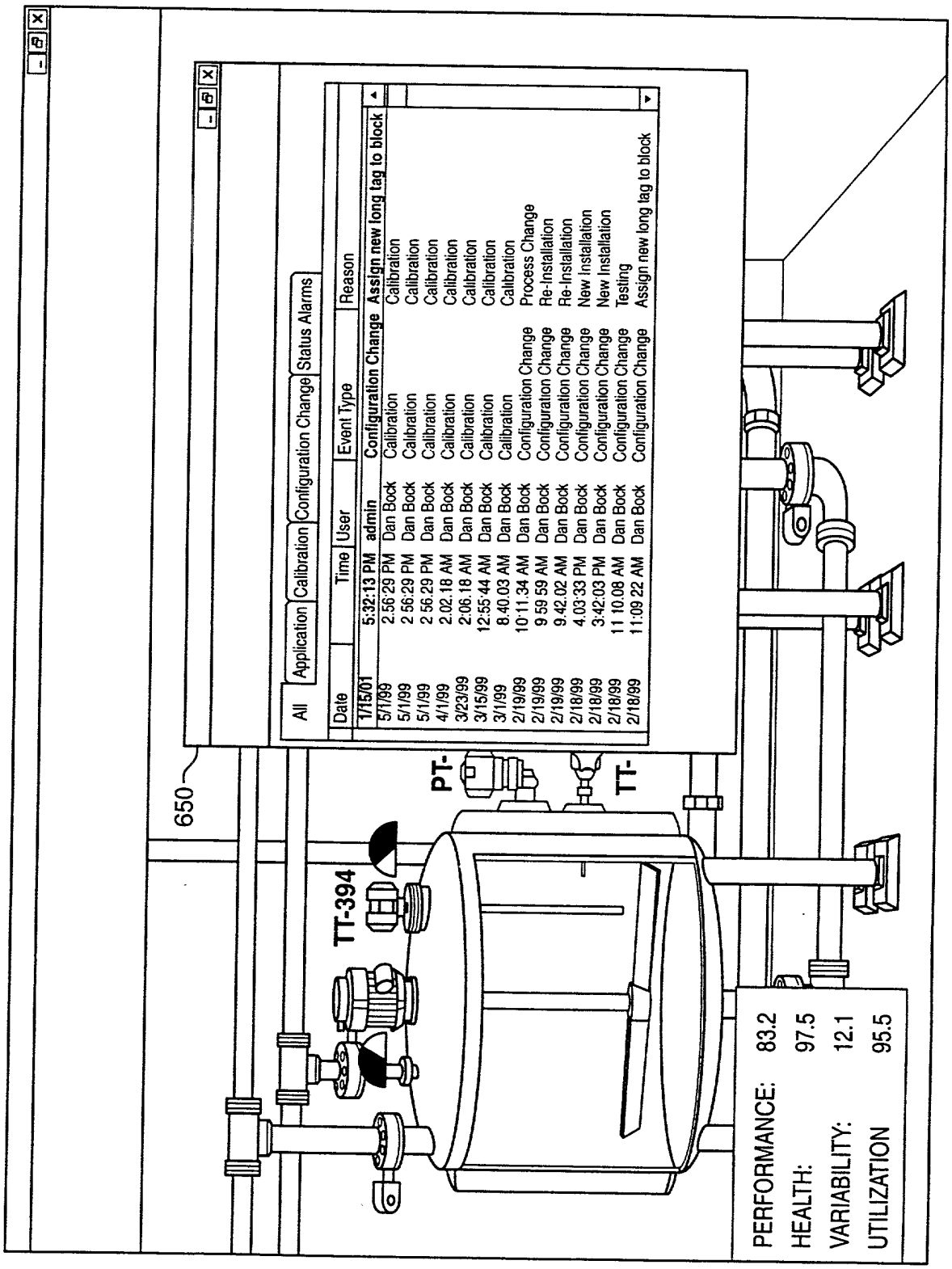

650
All
Application
Calibration
Configuration Change
Status Alarms
Date
Time
User
Event Type
Reason
1/15/01 5:32:13 PM admin Configuration Change Assign new long tag to block
5/1/99 2:56:29 PM Dan Bock Calibration Calibration
5/1/99 2:56:29 PM Dan Bock Calibration Calibration
5/1/99 2:56:29 PM Dan Bock Calibration Calibration
4/1/99 2:02:18 AM Dan Bock Calibration Calibration
3/23/99 2:06:18 AM Dan Bock Calibration Calibration
3/15/99 12:55:44 AM Dan Bock Calibration Calibration
3/1/99 8:40:03 AM Dan Bock Calibration Calibration
2/19/99 10:11:34 AM Dan Bock Configuration Change Process Change
2/19/99 9:59:59 AM Dan Bock Configuration Change Re-Installation
2/19/99 9:42:02 AM Dan Bock Configuration Change Re-Installation
2/18/99 4:03:33 PM Dan Bock Configuration Change New Installation
2/18/99 3:42:03 PM Dan Bock Configuration Change New Installation
2/18/99 11:10:08 AM Dan Bock Configuration Change Testing
2/18/99 11:09:22 AM Dan Bock Configuration Change Assign new long tag to block
PT-
TT-
TT-394
PERFORMANCE: 83.2
HEALTH: 97.5
VARIABILITY: 12.1
UTILIZATION 95.5

FIG. 17

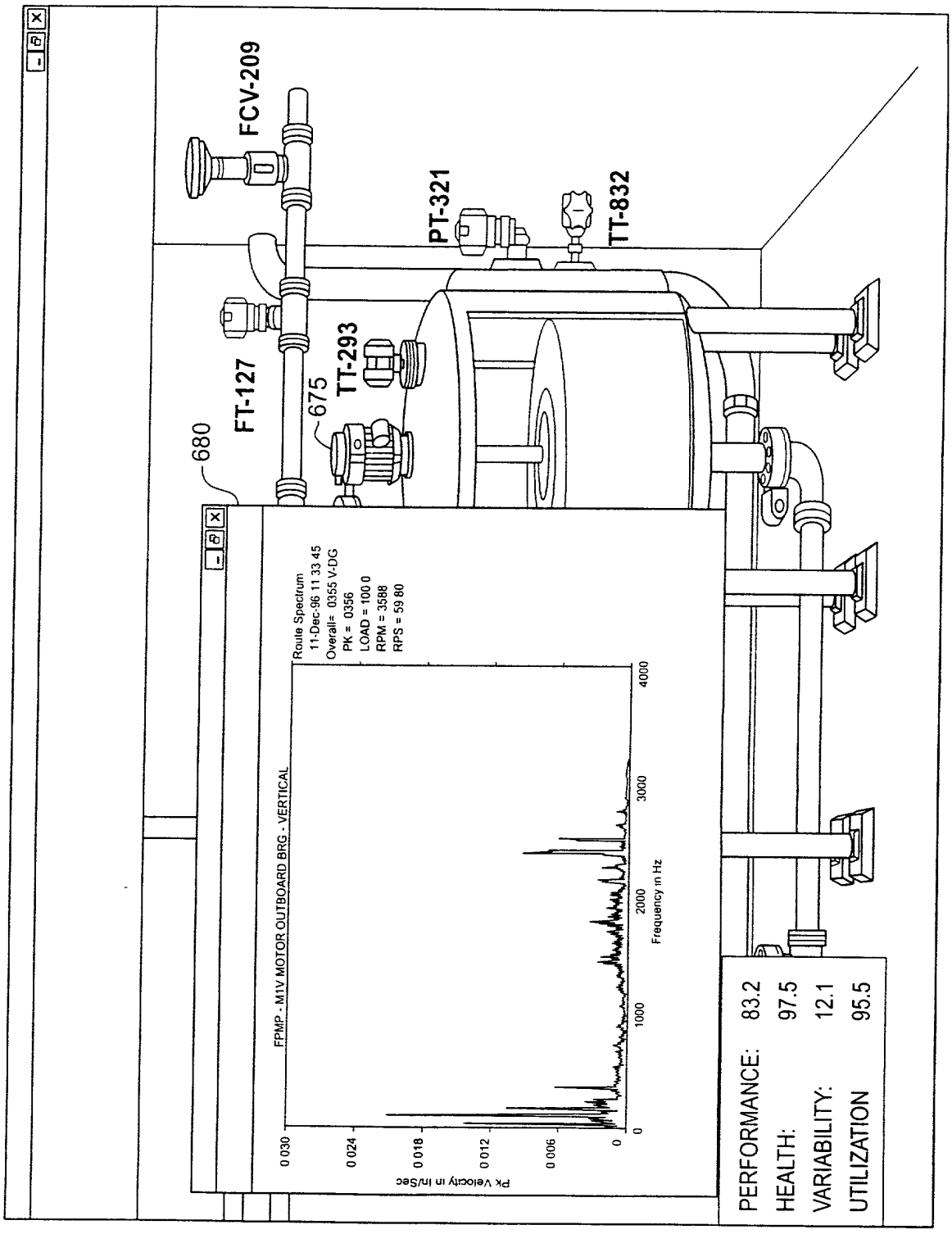

FCV-209
PT-321
TT-832
FT-127
675
TT-293
680
FFMP - M1V MOTOR OUTBOARD BRG - VERTICAL
Route Spectrum
11-Dec-96 11 33 45
Overall= 0355 V-DG
PK = 0356
LOAD = 100 0
RPM = 3588
RPS = 59 80
Pk Velocity in In/Sec
0 030
0 024
0 018
0 012
0 006
0
0
1000
2000
3000
4000
Frequency in Hz
PERFORMANCE: 83.2
HEALTH: 97.5
VARIABILITY: 12.1
UTILIZATION 95.5

FIG. 18

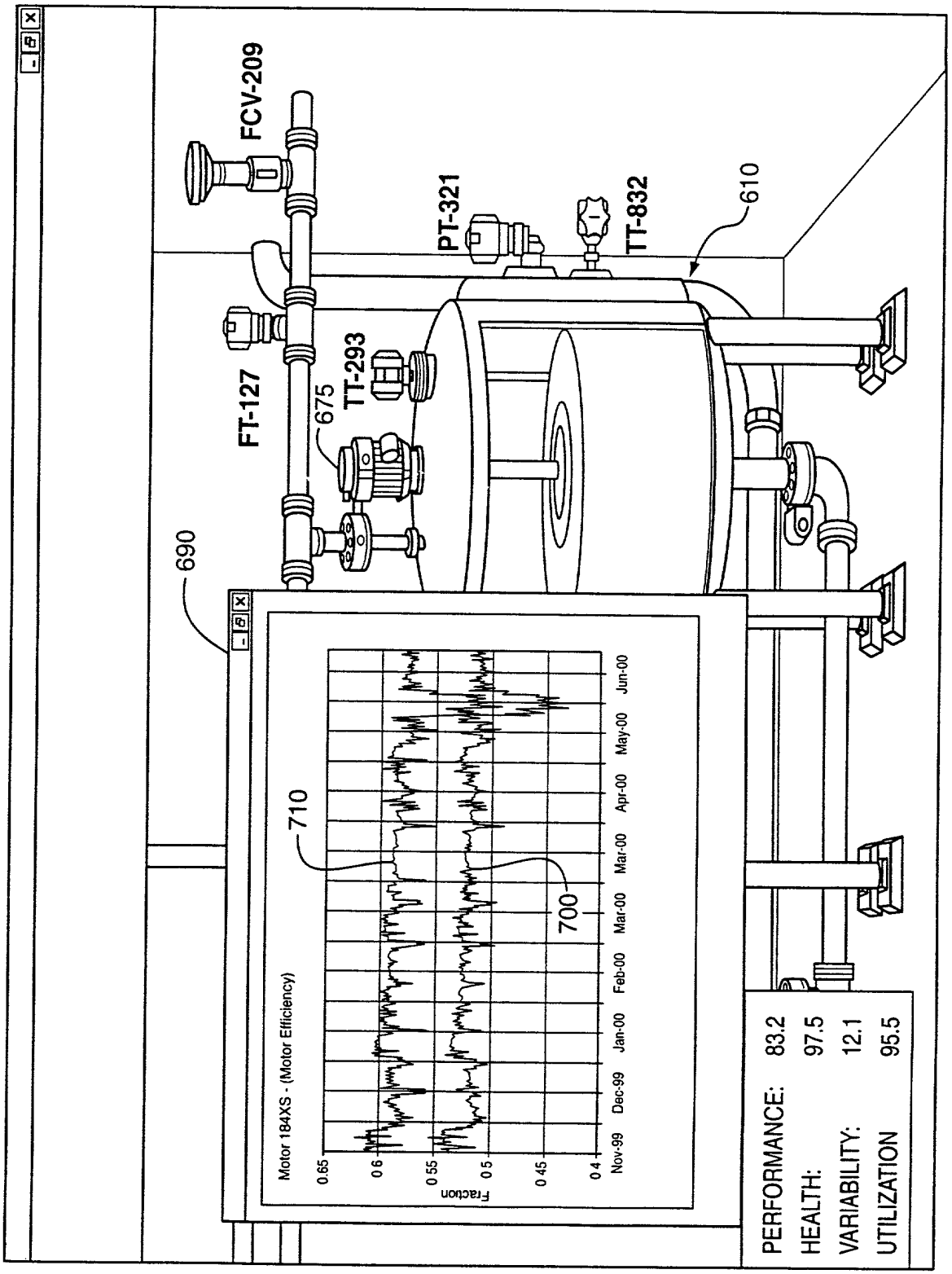

FCV-209
PT-321
TT-832
610
FT-127
675
TT-293
690
710
700
Motor 184XS - (Motor Efficiency)
Fraction
0.65
0.6
0.55
0.5
0.45
0.4
Nov-99
Dec-99
Jan-00
Feb-00
Mar-00
Apr-00
May-00
Jun-00
PERFORMANCE: 83.2
HEALTH: 97.5
VARIABILITY: 12.1
UTILIZATION 95.5

FIG. 19

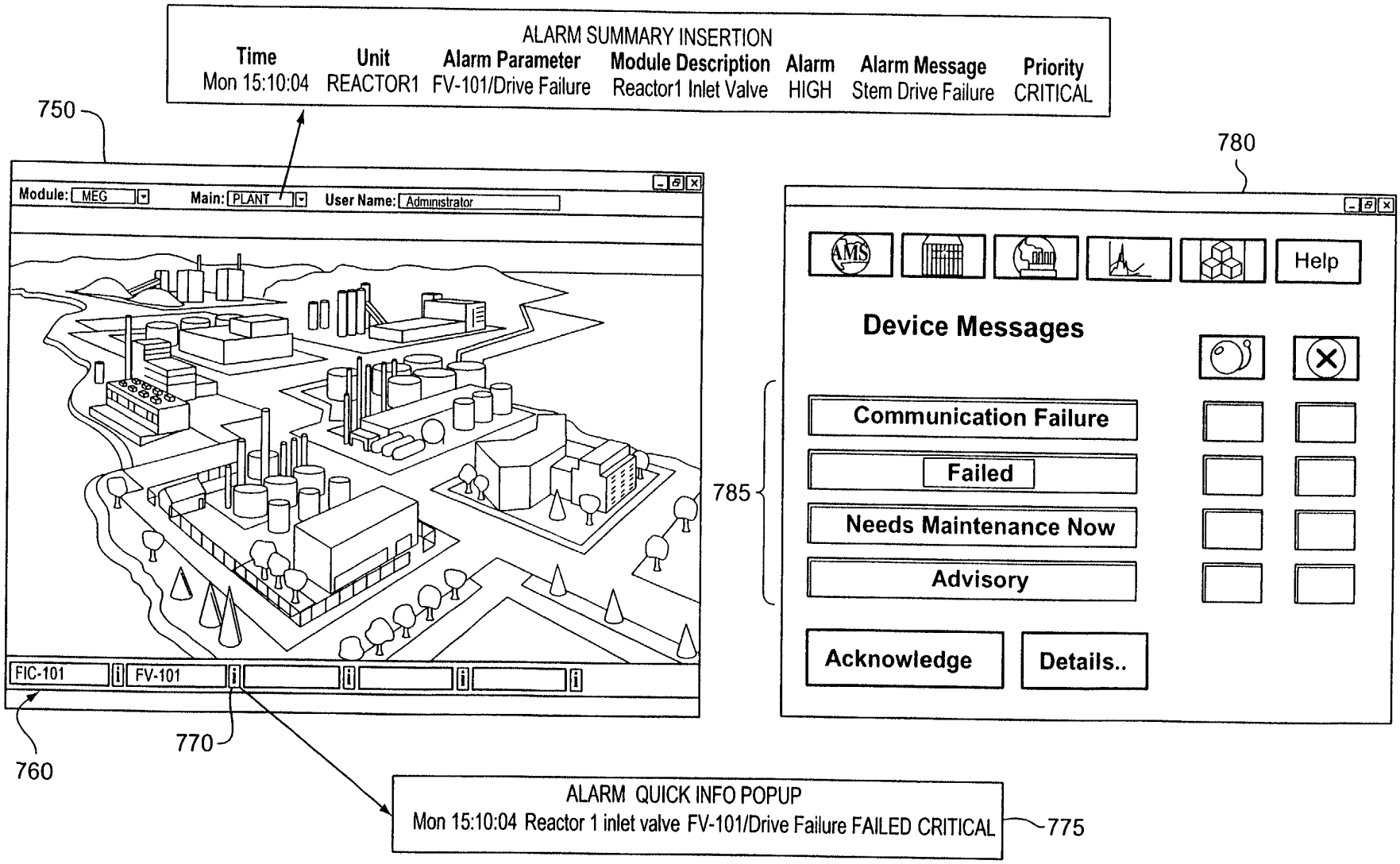


FIG. 20

Inventor(s): Eryurek, et al.
Figure No(s).: 20
Sheet No.: 18 of 29

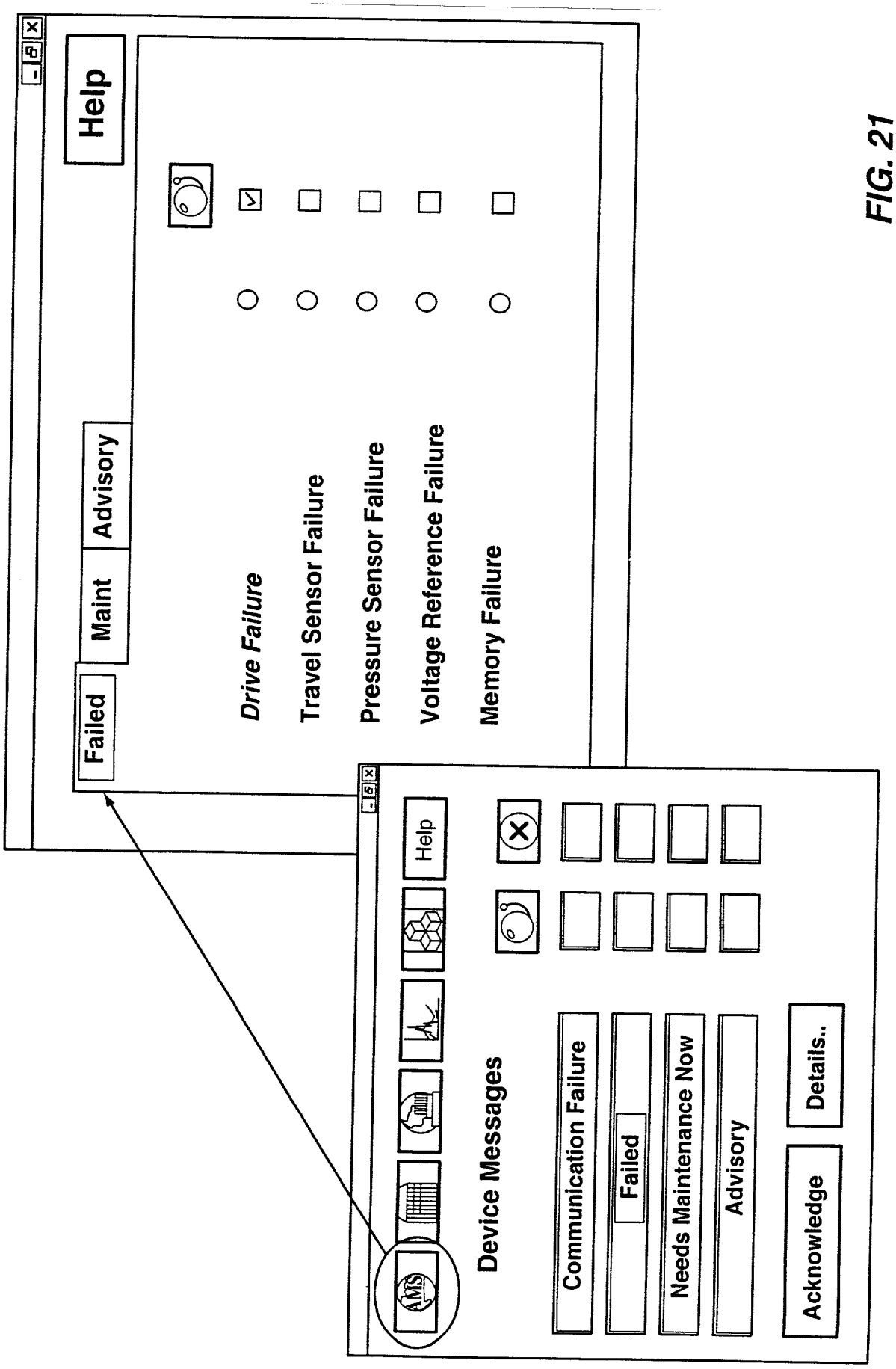

Help
Advisory
Maint
Failed
Drive Failure
Travel Sensor Failure
Pressure Sensor Failure
Voltage Reference Failure
Memory Failure
Help
Device Messages
AMS
Communication Failure
Failed
Needs Maintenance Now
Advisory
Acknowledge
Details..

FIG. 21

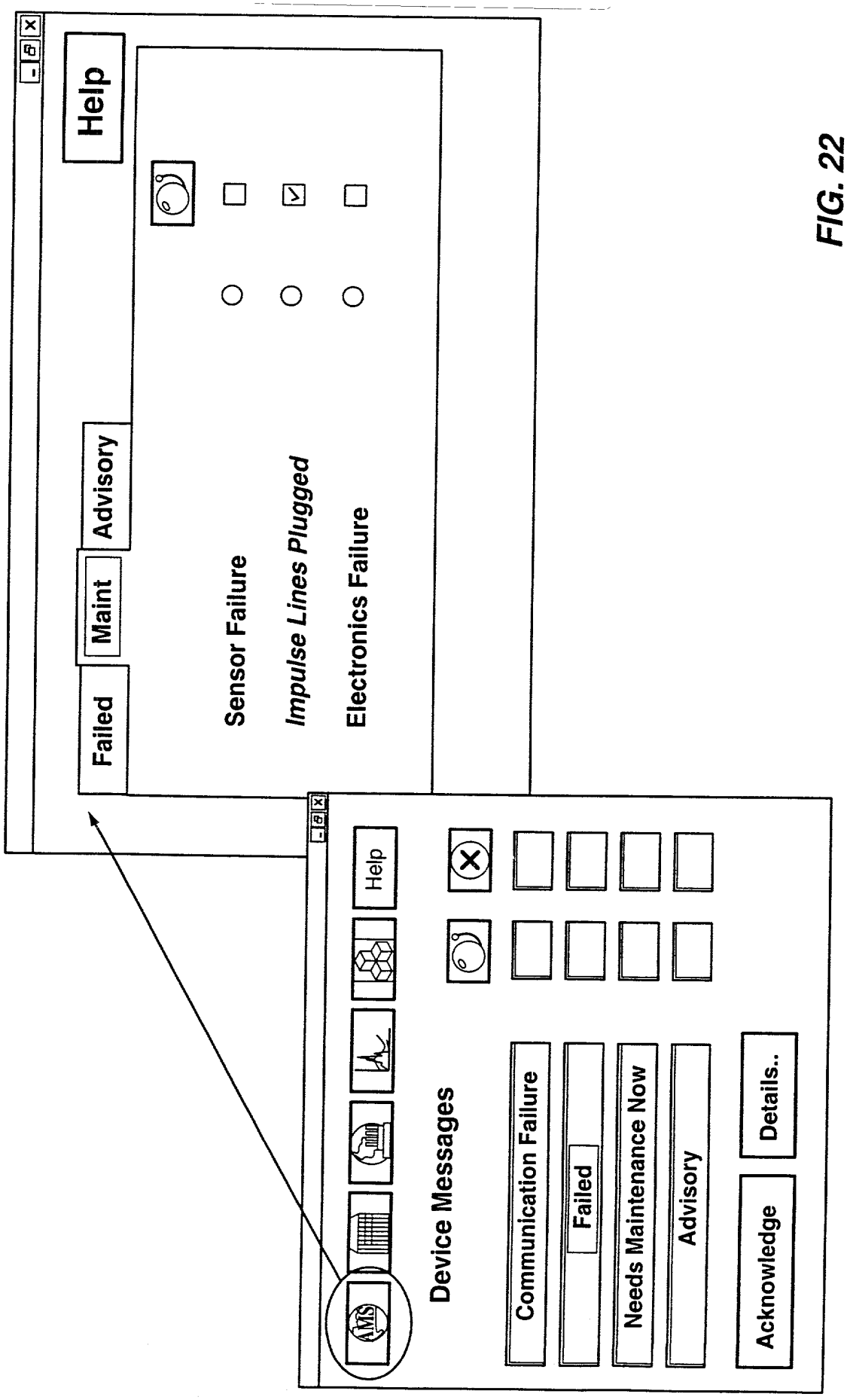

Help
Failed
Maint
Advisory
Sensor Failure
Impulse Lines Plugged
Electronics Failure
Help
Device Messages
Communication Failure
Failed
Needs Maintenance Now
Advisory
Acknowledge
Details..

FIG. 22

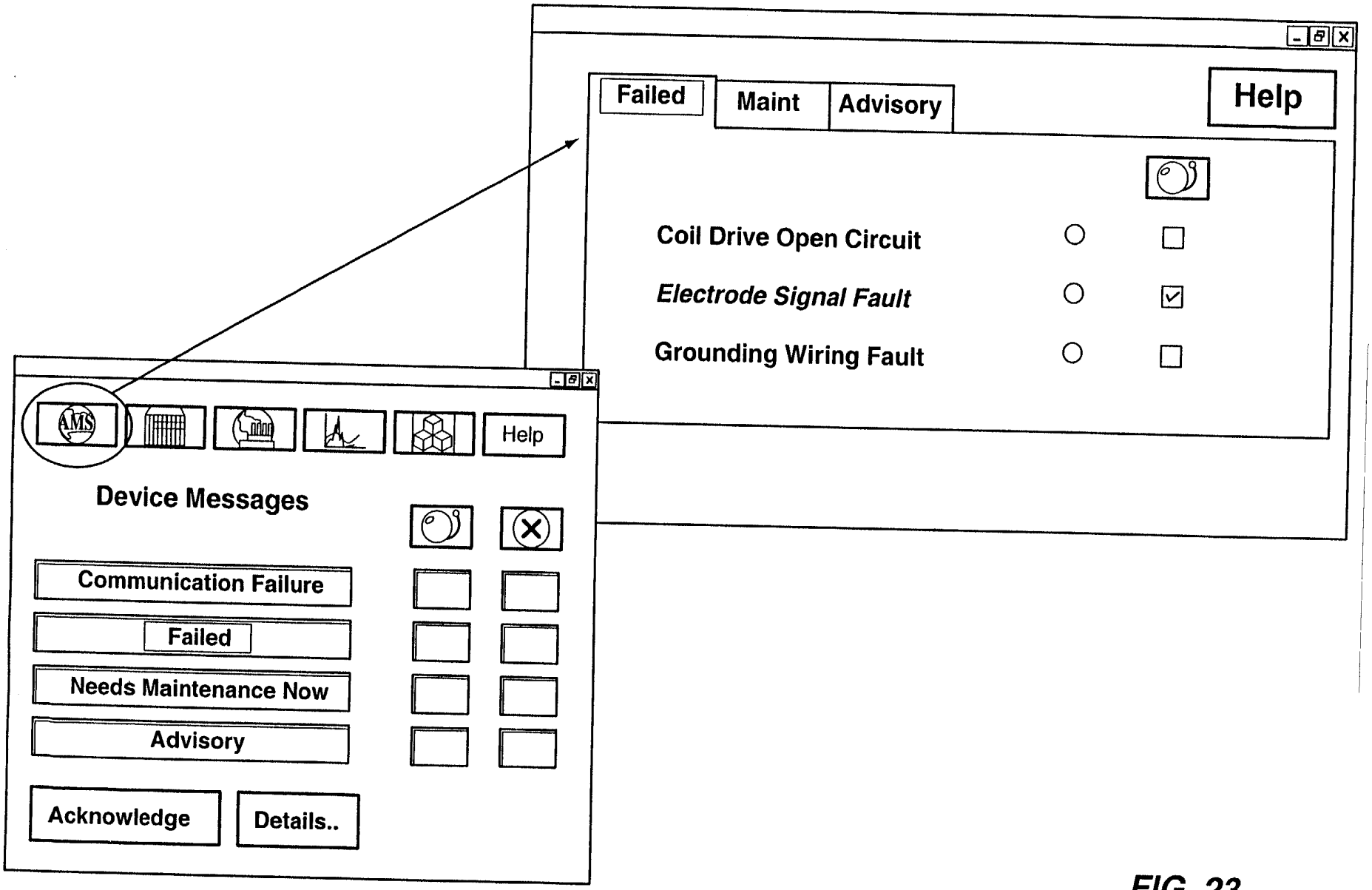
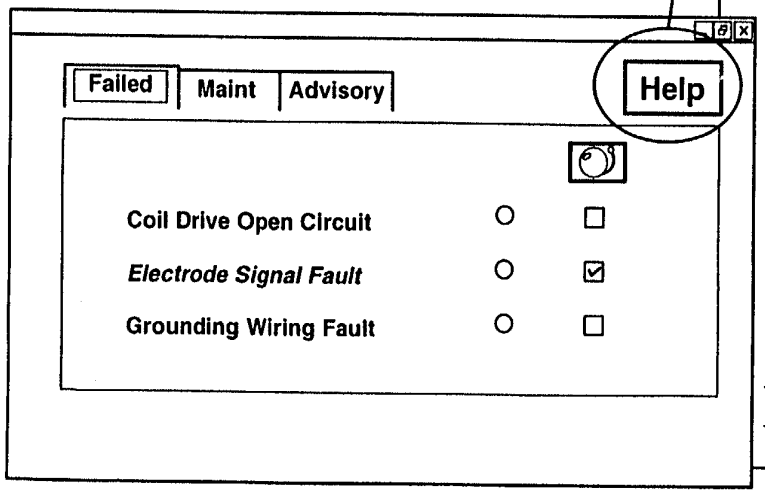


FIG. 23

Inventor(s): Eryurek, et al.
Figure No(s).: 23
Sheet No.: 21 of 29

FIG. 24



Electrode Signal Fault Detected

The flow signal has been compromised. The process variable is likely reading less than expected.

1. Remove any moisture or contamination in the flowtube terminal block or, if applicable, the sealed electrode compartments.

WARNING! The electrode compartment may contain line pressure. Reomoving the cover before depressurizing may result in death or serious injury.

2. Perform flowtube electrical resistance tests. Confirm the resistance reading between coil ground (ground symbol) and coil (1 or 2) is infinity. Confirm the resistance reading between electrode ground (17) and an electrode (18 or 19) is greater than 2 kohms and rises. For more detailed information, consult the flowtube product manual.

3. Verify flowtube is electrically connected to the process with grounding electrode, grounding rings with grounding straps, or lining protector with grounding straps.

4. Verify transmitter electronics with Model 8714 reference standard. The dial on the 8714 should be set at 9.1 m/s (30 ft/sec). The transmitter should be set up with the nominal flowtube calibration number (1000015010000000) and 5 Hz coil drive frequency.

5. Properly connect the wiring between the flowtube and the transmitter on the flowtube. Corresponding terminal block numbers in the flowtube and transmitter must be connected.

To turn off electrode signal fault detection, go to the diagnostic screen in the transducer block properties.

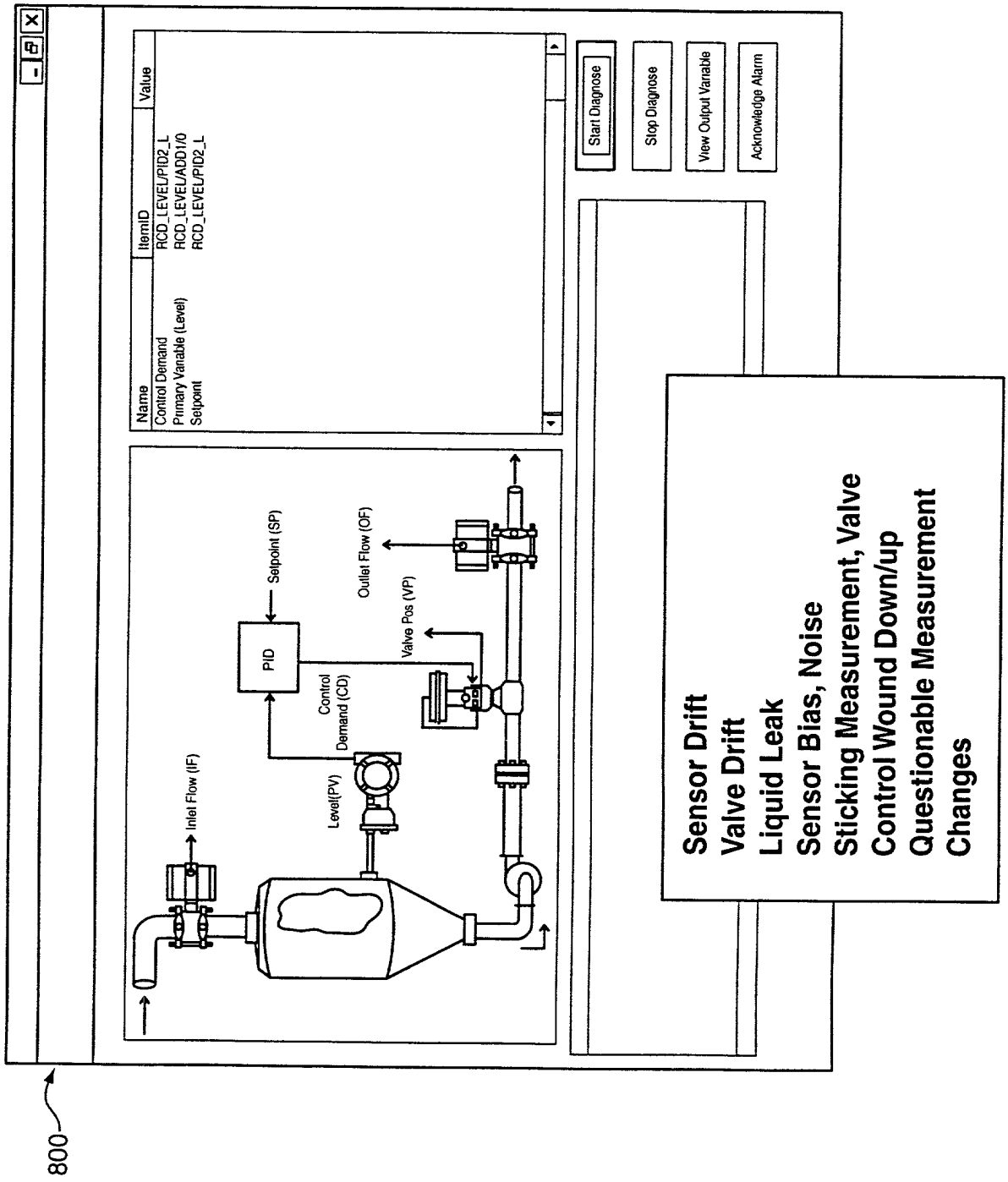

800
Name
ItemID
Value
Control Demand
RCD_LEVEL/PID2_L
Primary Variable (Level)
RCD_LEVEL/ADD1/0
Setpoint
RCD_LEVEL/PID2_L
Start Diagnose
Stop Diagnose
View Output Variable
Acknowledge Alarm
Inlet Flow (IF)
Level(PV)
Control Demand (CD)
PID
Setpoint (SP)
Valve Pos (VP)
Outlet Flow (OF)
Sensor Drift
Valve Drift
Liquid Leak
Sensor Bias, Noise
Sticking Measurement, Valve
Control Wound Down/up
Questionable Measurement
Changes

FIG. 25

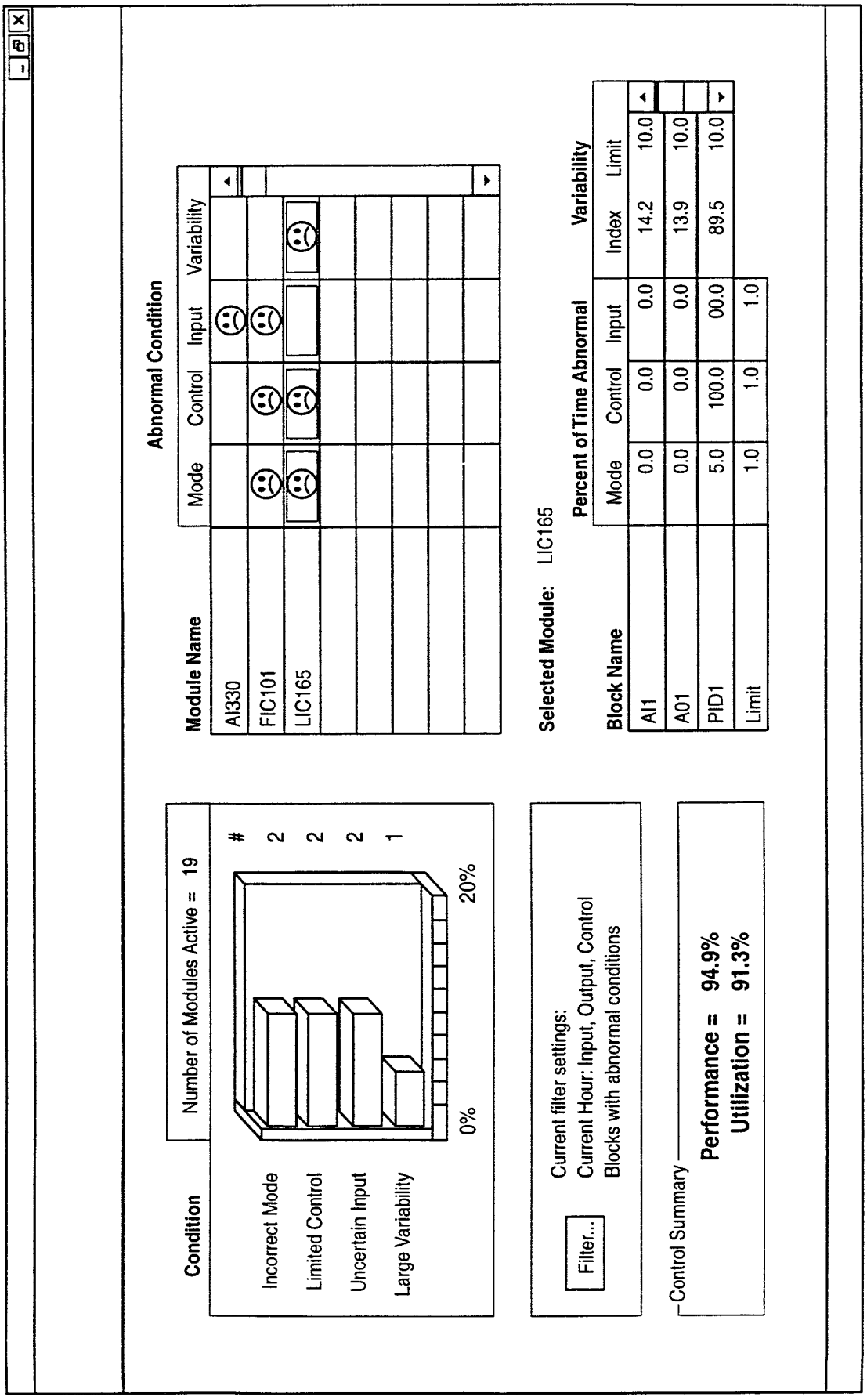

Abnormal Condition
Module Name
Mode
Control
Input
Variability
AI330
FIC101
LIC165
Condition
Number of Modules Active = 19
#
Incorrect Mode
Limited Control
Uncertain Input
Large Variability
2
2
2
1
0%
20%
Selected Module: LIC165
Percent of Time Abnormal
Variability
Block Name
Mode
Control
Input
Index
Limit
AI1
0.0
0.0
0.0
14.2
10.0
A01
0.0
0.0
0.0
13.9
10.0
PID1
5.0
100.0
00.0
89.5
10.0
Limit
1.0
1.0
1.0
Filter...
Current filter settings:
Current Hour: Input, Output, Control
Blocks with abnormal conditions
Control Summary
Performance = 94.9%
Utilization = 91.3%

FIG. 26

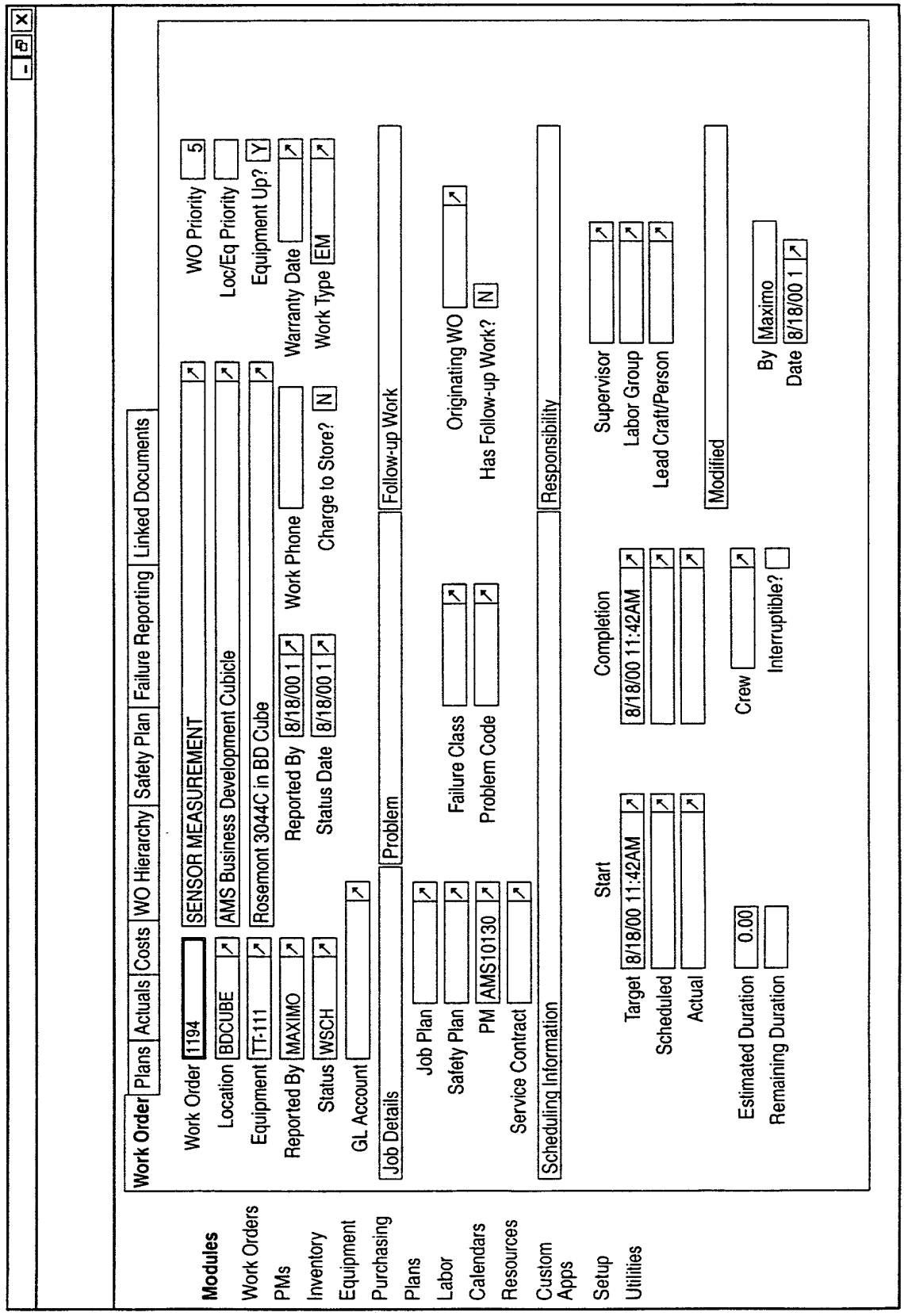

Modules
Work Orders
PMs
Inventory
Equipment
Purchasing
Plans
Labor
Calendars
Resources
Custom Apps
Setup
Utilities
Work Order
Plans
Actuals
Costs
WO Hierarchy
Safety Plan
Failure Reporting
Linked Documents
Work Order 1194
Location BDCUBE
Equipment TT-111
Reported By MAXIMO
Status WSCH
GL Account
SENSOR MEASUREMENT
AMS Business Development Cubicle
Rosemont 3044C in BD Cube
Reported By 8/18/00 1
Status Date 8/18/00 1
Work Phone
Charge to Store? N
WO Priority 5
Loc/Eq Priority
Equipment Up? Y
Warranty Date
Work Type EM
Job Details
Problem
Follow-up Work
Job Plan
Safety Plan
PM AMS10130
Service Contract
Failure Class
Problem Code
Originating WO
Has Follow-up Work? N
Scheduling Information
Responsibility
Start
Target 8/18/00 11:42AM
Scheduled
Actual
Completion
8/18/00 11:42AM
Supervisor
Labor Group
Lead Craft/Person
Modified
Estimated Duration 0.00
Remaining Duration
Crew
Interruptible?
By Maximo
Date 8/18/00 1

FIG. 27

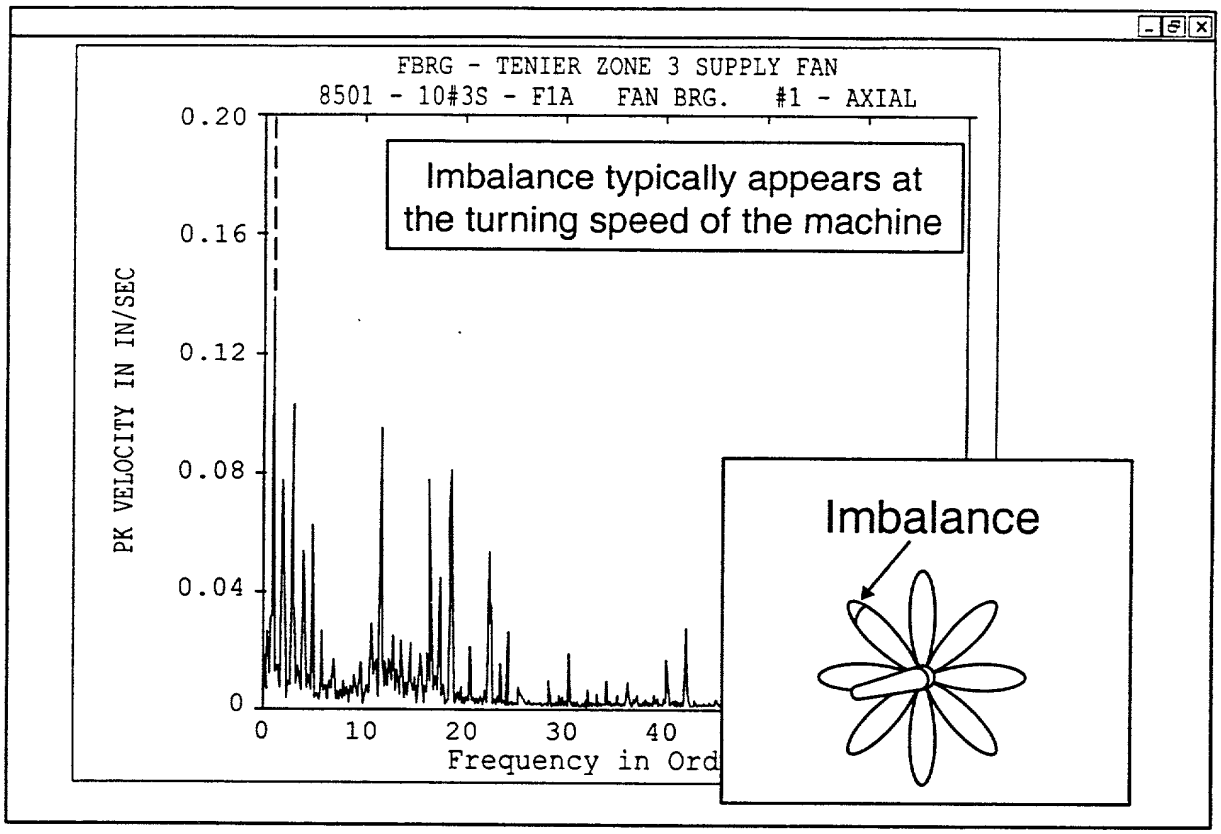

FBRG - TENIER ZONE 3 SUPPLY FAN
8501 - 10#3S - F1A FAN BRG. #1 - AXIAL
Imbalance typically appears at the turning speed of the machine
PK VELOCITY IN IN/SEC
0.20
0.16
0.12
0.08
0.04
0
0 10 20 30 40
Frequency in Ord
Imbalance

FIG. 28

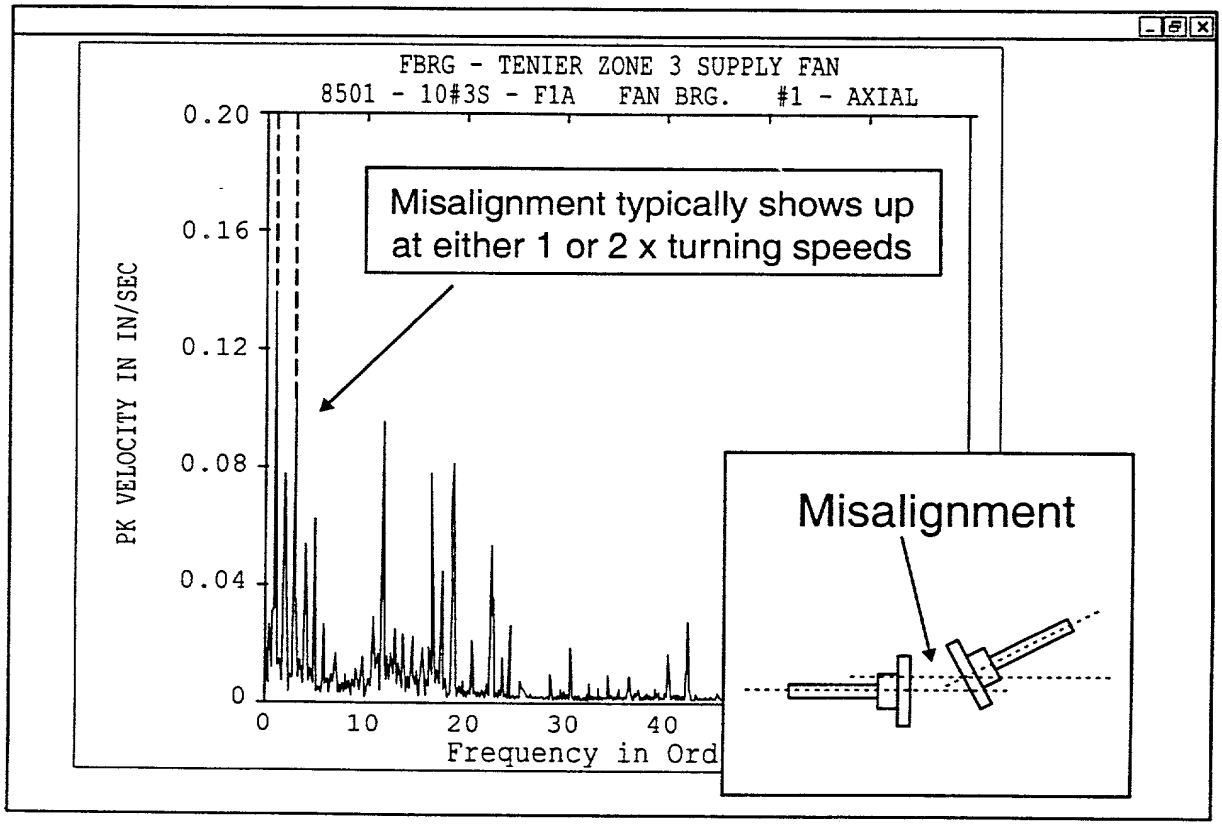

FBRG - TENIER ZONE 3 SUPPLY FAN
8501 - 10#3S - F1A FAN BRG. #1 - AXIAL
Misalignment typically shows up at either 1 or 2 x turning speeds
PK VELOCITY IN IN/SEC
0.20
0.16
0.12
0.08
0.04
0
0 10 20 30 40
Frequency in Ord
Misalignment

FIG. 29

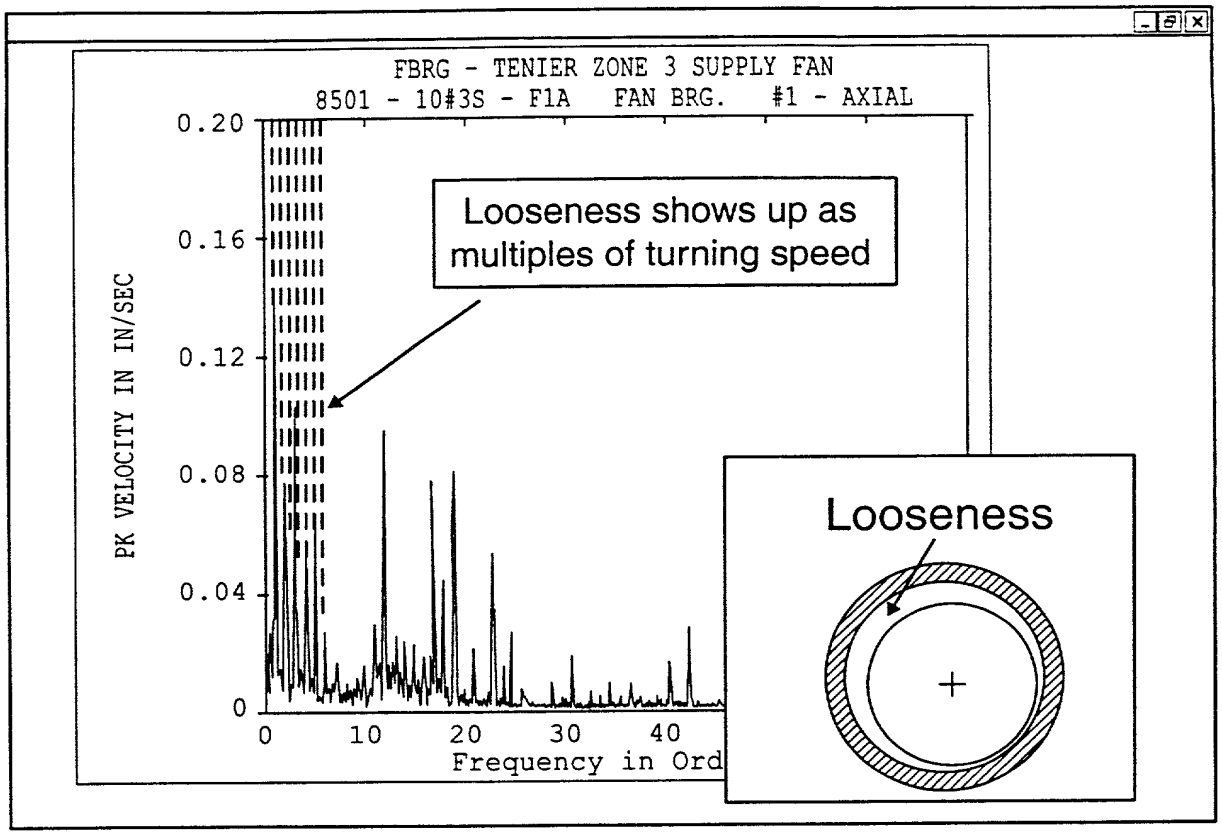


FIG. 30

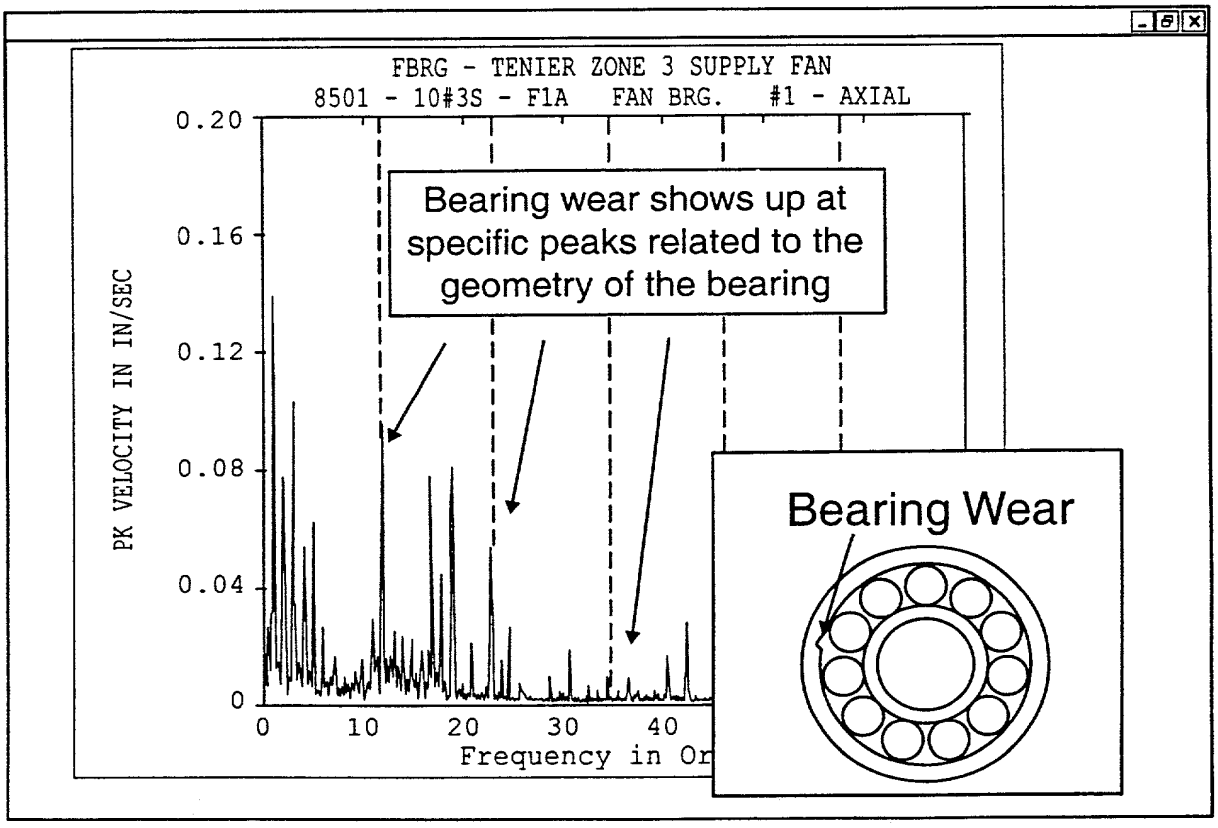


FIG. 31

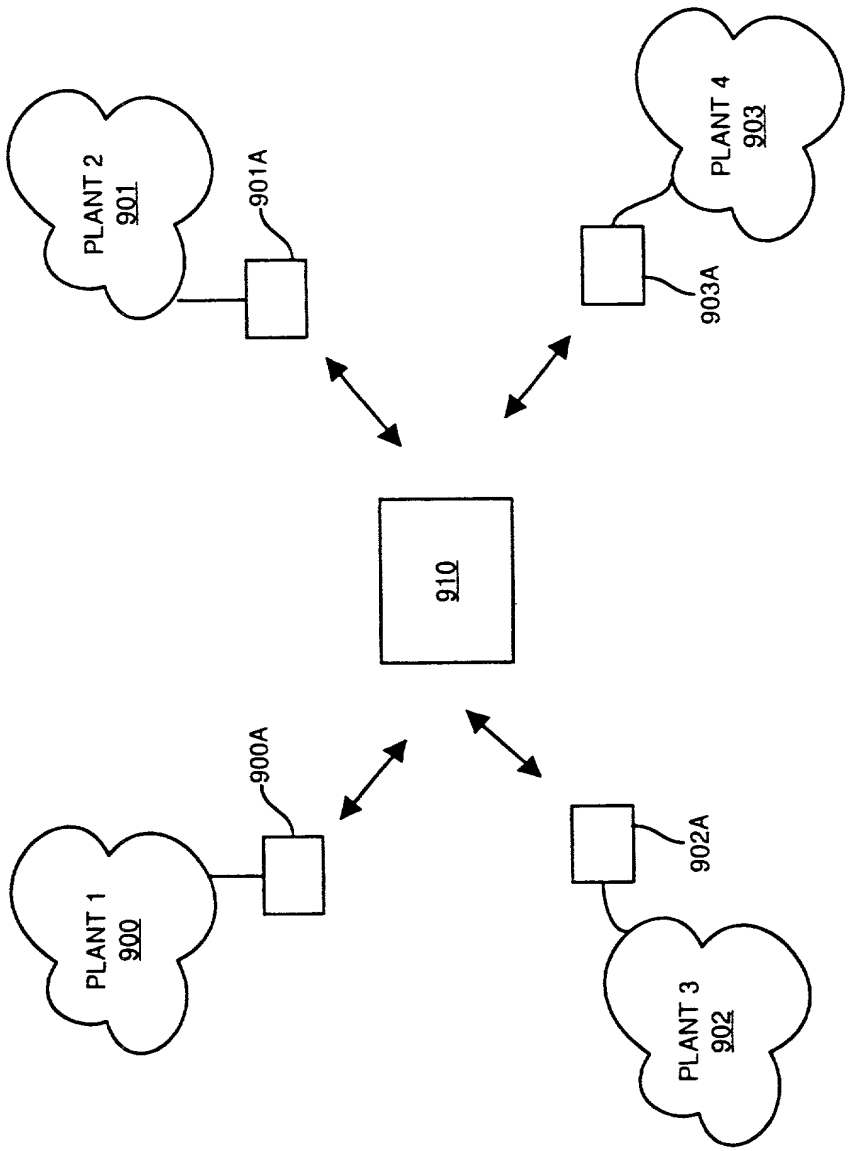

PLANT 2
901
901A
PLANT 4
903
903A
910
900A
PLANT 1
900
902A
PLANT 3
902

FIG. 32

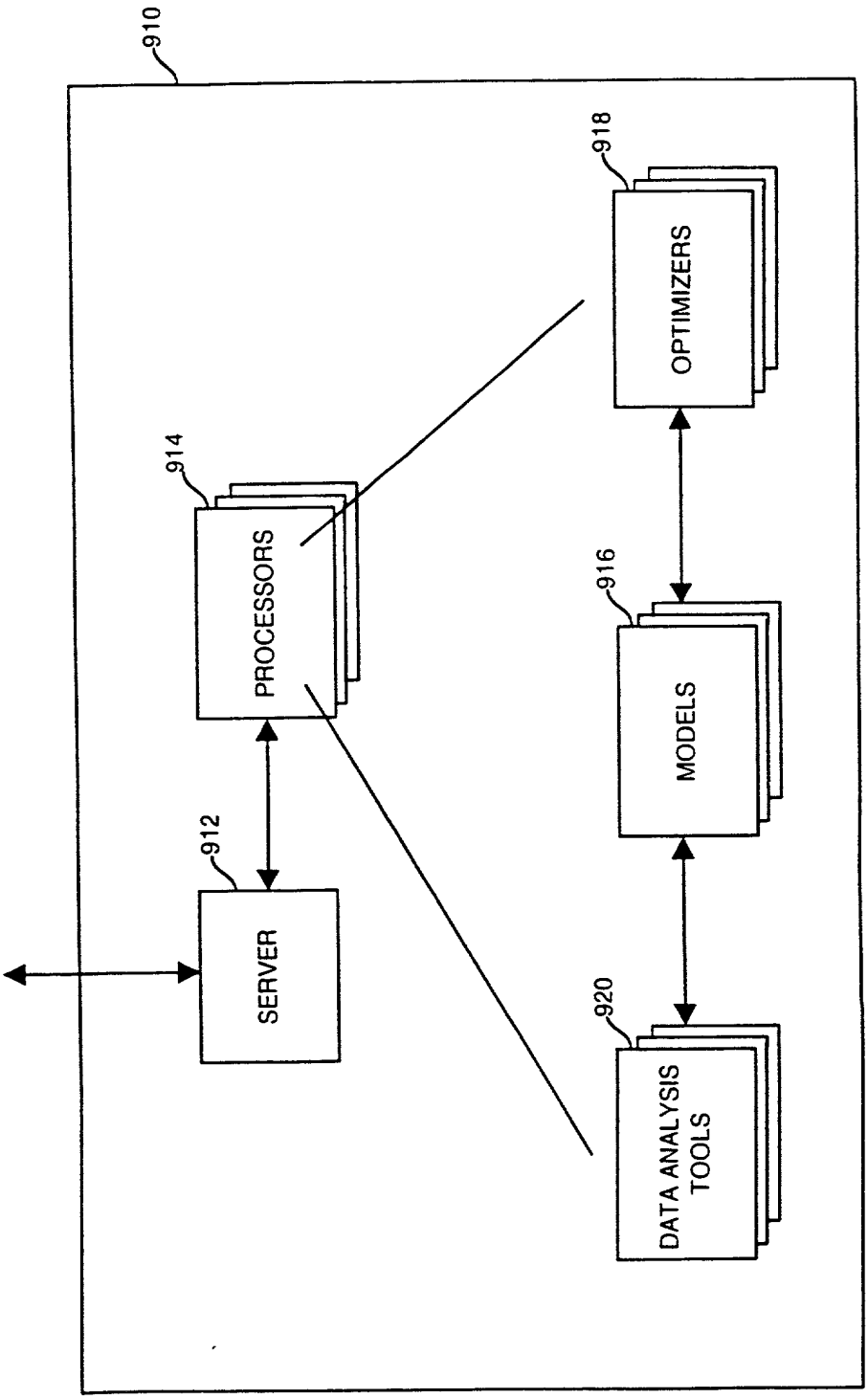

910
918
OPTIMIZERS
914
PROCESSORS
916
MODELS
912
SERVER
920
DATA ANALYSIS TOOLS

FIG. 33